

S/195/62/003/006/007/011  
E075/E436

AUTHORS: Vlasov, V.G., Zhukovskiy, V.M.

TITLE: Reduction of uranium trioxide with ammonia

PERIODICAL: Kinetika i kataliz, v.3, no.6, 1962, 882-886

TEXT: The kinetics of reduction of  $UO_3$  was investigated in the temperature range 300 to 425°C under 10 to 600 mm Hg partial  $NH_3$  pressure. Amorphous  $UO_3$  (0.5 g) was heated after drying in high vacuum in a circulatory apparatus with a continuous recording of its weight losses. The composition of end products was checked by their decomposition to  $U_3O_8$  at 950°C in air and by Debye-Sherer X-ray analysis. For a fixed  $NH_3$  pressure, the reduction rate decreases with decreasing temperature while the induction period increases. The dependence of the rate of the reaction  $w$  on partial  $NH_3$  pressure  $P_{NH_3}$  is given by

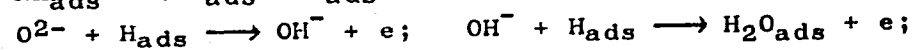
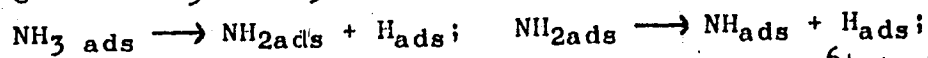
$$w = k \left[ 1 - \frac{b \cdot P_{NH_3}}{1 + b P_{NH_3}} \right] \quad (1)$$

where  $k$  and  $b$  are constants ( $k = 1.89\%/min$  and  
Card 1/2

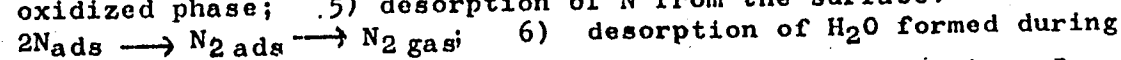
S/195/62/003/006/007/011  
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Reduction of uranium ...

$b = 0.00312 \text{ mm}^{-1} \text{ Hg}$  at  $400^\circ\text{C}$ ). The apparent activation energy for the process is  $45.3 \text{ kcal/mole}$  and practically does not depend on the degree of  $\text{UO}_3$  reduction. The authors conclude that the reduction is realized in the following stages: 1) adsorption of gaseous  $\text{NH}_3$  on  $\text{UO}_3$  surface, 2) decomposition of adsorbed  $\text{NH}_3$ :



$\text{U}^{6+} + 2\text{e} \longrightarrow \text{U}^{4+}$ ; 4) rearrangement of crystalline lattice of the oxidized phase; 5) desorption of N from the surface;



the reduction. The slowest stage in this process is stage 5.

There are 5 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova  
(Ural Polytechnic Institut imeni S.M.Kirov)

SUBMITTED: March 24, 1961 (initially)  
Card 2/2 September 11, 1961 (after revision)

BESSONOV, A.F.; VLASOV, V.G.

Kinetics of uranium oxidation by air, oxygen, and carbon dioxide.  
Izv. vys. ucheb. zav.; tsvet. met. 5 no.4:137-142 '62. (MIRA 16:5)

1. Ural'skiy politekhnicheskii institut.  
(Uranium) (Oxidation)

VLASOV, V.G.; BESSONOV, A.F.

Oxidation of uranium dioxide. Izv. vys. ucheb. zav.; tsvet. met. 5 no.5:  
113-122 '62. (MIRA 15:10)

1. Ural'skiy politekhnicheskiy institut.  
(Uranium oxide) (Oxidation)

ZHUKOVSKIY, V.M.; VLASOV, V.G.; LEBEDEV, A.G.

Electric properties of the system uranium - oxygen in the range of  
 $U_3O_8$  -  $UO_2$  compounds. Fiz. met. i metalloved. 14 no.2:319-320 Ag '62.  
(MIRA 15:12)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.  
(Uranium compounds—Electric properties)

L1523  
S/126/62/014/003/020/022  
E039/E420

24200 21210  
AUTHORS: Zhukovskiy, V.M., Vlasov, V.G., Lebedev, A.G.  
TITLE: Electrical properties of the uranium-oxygen system in the range of composition  $UO_3$  to  $U_3O_8$   
PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.3, 1962, 475-478

TEXT: The range of uranium-oxygen compounds  $UO_2$  to  $U_3O_8$  investigated by other workers is extended to cover  $UO_3$  to  $U_3O_8$ . Electrical conductivity is measured in the temperature range 25 to 200°C. Samples are prepared from  $UO_3$  by dissociation in a muffle furnace. Spectroscopic measurements show the presence of impurities Na, K, Mn, Fe, Si and Al, the largest component being Na at  $3.8 \times 10^{-2}\%$ . Debye-Scherrer X-ray analysis indicates that  $UO_3$  is amorphous while  $U_3O_8$  has a hexagonal lattice. Intermediate compounds show a mixture of the two phases, even  $UO_{2.97}$  exhibits weak lines of the  $U_3O_8$  structure. Samples are formed into tablets 14.5 mm in diameter and 7 mm thick at a pressure of 3000 kg/cm<sup>2</sup>. Densities after compression are 3.0 g/cm<sup>3</sup> (for  $UO_3$ ) and 3.65 g/cm<sup>3</sup> (for  $U_3O_8$ ). Resistances in the range  $10^6$  to  $10^8$  ohm-cm.

S/126/62/014/003/020/022  
E039/E420

Electrical properties ....

1011 ohms are measured using a constant current megohmmeter with an accuracy of 2 to 20%. Resistances in the range  $10^{-1}$  to  $10^{-6}$  ohm are measured using an a.c. bridge at 1000 c/s with an accuracy of better than 5%. Samples are measured under vacuum ( $10^{-3}$  to  $10^{-4}$  mm Hg). Values of the specific electrical conductivity  $\kappa$  ( $\text{ohm}^{-1}\text{cm}^{-1}$ ) for  $\text{UO}_3$  and  $\text{UO}_{2.67}$  at 25 and 200°C are given in the table. The temperature dependence of the electrical conductivity is given by

$$\kappa = A \exp(-\Delta E/2kT)$$

where  $\Delta E$  is the activation energy. Isotherms of  $\kappa$  are given and also the dependence of  $\Delta E$  on composition. It is shown that all samples have a negative thermal emf with respect to copper. Both the electrical measurements and X-ray analysis show that there is a transition from a state of low order for  $\text{UO}_3$  to greater order for  $\text{U}_3\text{O}_8$ . There are 2 figures and 1 table.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova  
(Ural Polytechnical Institute imeni S.M.Kirov)

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S/126/62/014/003/021/022  
EO39/E420

AUTHORS: Bessonov, A.F., Vlasov, V.G.  
TITLE: The interaction of uranium with nitrogen  
PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.3, 1962, 478-479  
TEXT: The kinetic processes of oxidation have been investigated previously by the authors. This is a continuation and the formation of uranium nitride is investigated. The apparatus and method is described in the previous paper, the nitrogen gas being obtained from liquid nitrogen and purified by passing over titanium at 800°C and CaCl<sub>2</sub>. The basic investigation is carried out at 200 mm Hg in the temperature range 400 to 920°C. Initially the reaction proceeds parabolically with time for about 0.5 min and then continues linearly for all temperatures. No reaction is observed below 400°C. At 590 and 710°C the rate of reaction is proportional to the square root of the pressure. Circulation of the nitrogen does not produce any effect on the reaction rate. The activation energy of the process at 630°C is 16 kcal/mole and at higher temperatures 7 kcal/mole.  
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The interaction of uranium ...

S/126/62/014/003/021/022  
EO39/E420

X-ray analysis of the nitride formed at 920°C shows that it has a face-centred cubic lattice. The initial rate of reaction is modified by the presence of the  $UO_2$  layer on the uranium surface and the linear part is associated with the diffusion of the nitrogen through the nitride layer. It is suggested that the square root dependence of the rate of reaction on pressure is due to the dissociation of the nitrogen molecules into atoms during the diffusion process through the nitride layer. The decrease in activation energy above 630°C is explained on the basis of the  $U_\alpha$  to  $U_\beta$  transition. There is 1 figure.

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3507  
S/080/61/035/003/017/024  
D202/T302

21 4100  
AUTHORS: Bessonov, A. F., Vlasov, V. G. and Strekalovskiy, V. N.  
TITLE: Cyclic oxidation-reduction of uranium oxides  
PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 3, 1962, 657-660

TEXT: The subject of this study was the elucidation of the following questions: 1) Which phases are formed during the oxidation and reduction processes of active uranium dioxide and urano-uranium oxide? 2) Can the tetragonal phase be obtained at temperatures below 400 - 500°C? 3) The oxidation kinetics of active uranium dioxide, unstable at room temperature. The work is a repetition of investigations previously published by Western scientists. The authors state that their results are in good agreement with those given in Western literature. The following phases were found during the cyclic oxidation and reduction of uranium oxides in the temperature range from 20 to 500°C:  $UO_2$ ,  $UO_{2+x}$ ,  $UO_{2.25}$ ,  $UO_{2.36+x}$ ,  $UO_{2.6+x}$ ,  $UO_{2.67}$ . The tetragonal phase does exist as a stable one

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Cyclic oxidation-reduction ...

S/080/62/035/003/017/024  
D202/D302

at some definite temperature range between 500°C and room temperature. There are 3 figures and 8 references: 1 Soviet-bloc and 7 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: R. W. Willardson, I. Moody and H. Goering, J. Inorg. Nuclear Chem., 6, 19-38, 1958; O. Runnols, Nucleonics, 17, 104-111, 1959; A. Arrot and I. Goldman, Phys. Rev., 108, 948, 1957; P. Blackburn, I. Weissbart and E. Gulbransen, J. Phys. Chem., 62, 8, 12, 1958.

SUBMITTED: January 16, 1961

Card 2/2

35698  
S/080/62/035/003/018/024  
D202/D302

21,4100  
AUTHORS:

Vlasov, V. G. and Kozlov, V. A.

TITLE:

Low-temperature carbothermal reduction of  $U_3O_8$

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 3, 1962, 660-663

TEXT: A study of the kinetics of the reduction of  $U_3O_8$  with solid carbon. The authors carried out experiments in a temperature range 625 - 725°C on an installation and by a method described in a previous publication and studied the effect of  $Na_2CO_3$  added to the oxide or to the reducing agent. It was found that the addition of  $Na_2CO_3$  to the carbon slows down the reduction; the addition of the latter to the oxide accelerates the process markedly. The rate of reaction does not depend on the degree of oxygen elimination until  $U_3O_8$  is fully converted to  $U_4O_9$ , but afterwards diminishes proportionally to the degree of reduction. This dependence may be ex-

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Low-temperature carbothermal ...

S/080/62/035/003/018/024  
D202/D302

pressed by  $\log \frac{a}{a-q} = k\tau$  where  $a$  is the degree of reduction (%) corresponding to  $UO_2$ ,  $q$  - the actual degree of reduction (%),  $k$  - a temperature constant and  $\tau$  - time. Activation energy for the reduction is 56 - 58 kcal/mol. There are 2 figures and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: D. Vangnan and R. W. Mardson, Preprint Nucl. Eng. a. Sci. conf. s.a., 13, 15, 1958.

SUBMITTED: January 30, 1961

Card 2/2

S/080/62/035/010/001/012  
D204/D307

AUTHORS: Zhukovskiy, V.I. and Vlasov, V.G.

TITLE: The effect of alkali metal carbonates on the rates of reduction of uranium trioxide

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 10, 1962, 2131-2134

TEXT: The effects of analytical purity  $\text{Li}_2\text{CO}_3$ ,  $\text{Na}_2\text{CO}_3$  and  $\text{K}_2\text{CO}_3$  were observed, on the rates of reduction of amorphous  $\text{UO}_3$  (specific surface  $15.0 \text{ m}^2/\text{g}$ , density  $6.5 \text{ g/cm}^3$ , containing about  $10^{-2} - 10^{-4} \%$  amounts of K, Na, Mn, Fe, Si, Cu, Al and Ni) with a dry,  $\text{NH}_3$ -free mixture of  $\text{H}_2$  and  $\text{N}_2$ , derived from the catalytic decomposition of ammonia. The carbonates were added, singly, in amounts of  $0.2 - 10 \text{ mol.}\%$  (w.r.t.  $\text{UO}_3$ ), were ground together with the oxide, and were preheated for 2 hours at  $380^\circ\text{C}$  before the reduction. The pressure of ( $3\text{H}_2 + \text{N}_2$ ) was  $200 \text{ mm Hg}$ ; and the temperature was  $400^\circ\text{C}$  in all cases. It was found that carbonate additions slow-

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The effect of alkali metal ...

S/080/62/035/010/001/012  
D204/D307

ed down the reaction,  $K_2CO_3$  being the most and  $Li_2CO_3$  the least effective; the retarding effect also increased with rising proportions of the additives. This anomalous behavior is ascribed to the formation of surface layers of uranates  $Me_2UO_4$  (where  $Me = Li, Na, K$ ) on the  $UO_3$ , which (1) exert a protective screening effect on the oxide, (2) promote the adsorption of water vapor, and (3) increase the concentration of free electrons in the surface of  $UO_3$ . Although effect (3) should accelerate the rate of reduction, the opposite is actually observed, since (1) and (2) predominate in practice. There is 1 table. ✓

ASSOCIATION: Ural'skiy politekhicheskiy institut im. S.M. Kirova  
(Urals Polytechnical Institute im. S.M. Kirov)

SUBMITTED: December 26, 1961

Card 2/2

S/195/63/004/001/005/009  
E075/E436

AUTHORS: Vlasov, V.G., Zhukovskiy, V.M.

TITLE: Reduction of uranium trioxide by a nitrogen-hydrogen mixture

PERIODICAL: Kinetika i kataliz, v.4, no.1, 1963, 76-81

TEXT: This work is a continuation of kinetic studies of the reduction of  $UO_3$  with various gases. An amorphous  $UO_3$  with the surface area of  $15 \text{ m}^2/\text{g}$  and density of  $6.5 \text{ g/cm}^3$  was reduced with a mixture of  $N_2$  and  $H_2$  resulting from the reduction of  $NH_3$  over Ni at  $930^\circ\text{C}$ . Full transition from  $UO_3$  to  $UO_2$  was considered as 100% reduction. The reduction was studied between 300 and  $500^\circ\text{C}$  at a pressure of  $P_{3H_2+N_2} = 200 \text{ mm Hg}$  and at  $425^\circ\text{C}$  with pressures ranging from 25 to 600 mm Hg. The rate of reduction increased rapidly with temperature, no induction periods being noticed. The effect of pressure on the reduction rate  $v$  is expressed by  $v = kP_{H_2}$ ,  $P_{H_2}$  being the partial pressure of hydrogen. The values of  $k$  are approximately 0.025. The reduction is therefore independent of  $N_2$  which acts only as a diluent. The process takes place in the following stages:  
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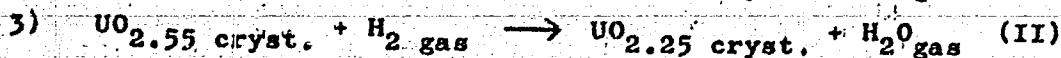
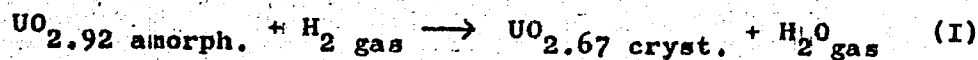


Reduction of uranium ...

S/195/63/004/001/005/009  
E075/E436

1)  $\text{UO}_3 \rightarrow \text{UO}_{2.92}$ , reduction rate = constant;

2) an autocatalytic process  $\text{UO}$ .



The first stage takes place in the presence of two solid phases and the second in the presence of one solid phase of changing composition with the reduction rate falling continuously. The apparent activation energies for the various stages of reduction vary from 26.5 to 31.7 kcal/mole. In general, the reduction with  $\text{N}_2 + \text{H}_2$  occurred more easily and to a fuller extent than that with  $\text{NH}_3$ . There are 4 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova  
(Ural Polytechnic Institute imeni S.M.Kirov)

SUBMITTED: May 13, 1961 (initially)

Card 2/2 September 26, 1961 (after revision)

S/126/63/015/002/008/033  
E039/E420

AUTHORS: Zhukovskiy, V.M., Tkachenko, Ye.V., Vlasov, V.G.

TITLE: On the question of phase conversion in reduced  $U_4O_9$

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.2, 1963,  
210-214

TEXT: The contradictory work of a number of authors on the state and structure of the phase compositions in the U-O system for the range  $UO_2 - UO_{2.25}$  is examined. The dependence of the density and parameters of the cubic lattice on the composition of the solid phase formed in reduced  $U_4O_9$  when decomposed by ammonia and solid carbon is investigated. With increase in quantity of introduced oxygen the density of the oxide is increased and the lattice parameter decreased. When the oxygen content of the oxide is changed it is necessary to alter the charge on some of the uranium ions in order to maintain electrical neutrality. In particular in  $UO_2$  uranium is found only in the form of  $U^{4+}$  ions (according to the authors' data), the lattice parameter is 5.47 Å and the density is 10.7 g/cm<sup>3</sup>. In the case of  $U_4O_9$  which has a lattice parameter of 5.44 Å and a density of 11.4 g/cm<sup>3</sup>, it is necessary to alter the  
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S/126/63/015/002/008/033  
E039/E420

On the question of phase ...

charge on some of the uranium ions from  $U^{4+}$  to  $U^{5+}$  or  $U^{6+}$ . The substitution of some  $U^{4+}$  ions by the smaller  $U^{5+}$  and  $U^{6+}$  ions may lead to a decrease in the lattice parameter for  $U_4O_9$  in spite of the introduction of more oxygen (the radii of the  $U^{4+}$ ,  $U^{5+}$  and  $U^{6+}$  ions are 1.05, 0.91 and 0.79 Å respectively). Densities measured experimentally compare well with those determined from X-ray diffraction analysis. The results are in agreement with the statement that the phase of  $UO_{2+x}$  has a cubic lattice of the fluorite type with disordered introduction of surplus oxygen and four atoms of uranium in the elementary cell. There are 3 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova  
(Ural Polytechnical Institute imeni S.M.Kirov)

SUBMITTED: July 7, 1962

Card 2/2

S/126/63/C15/CO2/013/033  
E193/E383

AUTHORS: Tkachenko, Ye.V. and Vlasov, V.G.  
TITLE: Phase-transformations during carbon reduction of uranium oxides  
PERIODICAL: Fizika metallov i metallovedeniye, v. 15, no. 2, 1963, 239 - 243  
TEXT: Acetylene soot was used to reduce  $UO_3$  at 400 - 500 °C,  $U_3O_8$  at 650 - 850 °C and  $U_4O_9$  at 700 - 950 °C. The kinetics of the reduction were studied by continuous weight measurements, X-ray diffraction being used to follow the phase-transformations. The results are reproduced in Figs. 1, 2, 3. In each figure, the rate of reduction ( $dp/d\tau$  for  $UO_3$  in Fig. 1,  $df/d\tau$  for  $U_3O_8$  in Fig. 2 and  $dq/d\tau$  for  $U_4O_9$  in Fig. 3) is plotted against the degree, % (p, f and q, respectively) of reduction of the respective substances, the composition of the solid phase at various stages of the process being shown at the bottom of each figure. Fig. 1 relates to reduction of  $UO_3$  carried out at 1 - 400, 2 - 425,

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S/126/63/015/002/013/033  
E193/E303

Phase-transformations during ....

3 - 450, 4 - 475 and 5 - 500 °C; Fig. 2 shows the reduction of  $U_3O_8$  at 1 - 650, 2 - 700, 3 - 725, 4 - 750, 5 - 775, 6 - 800 and 7 - 850 °C and Fig. 3 relates to reduction of  $U_4O_9$  at 1 - 700, 2 - 750, 3 - 800, 4 - 850 and 5 - 950 °C. The following phase-transformations were postulated for each of the processes studied:

- a)  $UO_3$  amorph.  $\rightarrow UO_{2.91} \rightarrow U_3O_8 \rightarrow U_{3.08-z}O_{8-z}$  max ;
- b)  $U_3O_8 \rightarrow U_{3.08-z}O_{8-z}$  max  $\rightarrow U_4O_9 \rightarrow UO_{2+x}$  max  $\rightarrow UO_{2+x}$  ;
- c)  $U_4O_9 \rightarrow UO_{2+x}$  max  $\rightarrow UO_{2+x}$  .

There are 3 figures.

ASSOCIATION: Ural'skiy politekhnicheskii institut im.S.M.Kirova  
(Ural' Polytechnical Institute im. S.M. Kirov)

SUBMITTED: July 17, 1962  
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Phase-transformations during ....

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E193/E383

Fig. 1:

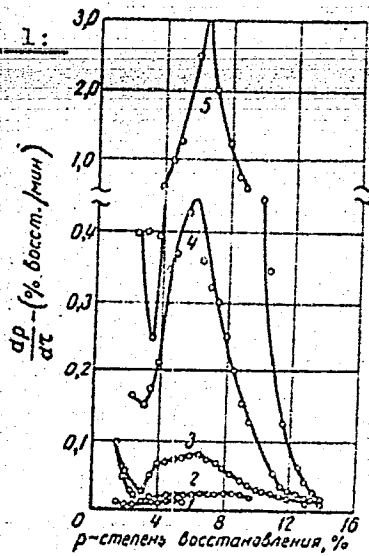


Fig. 2:

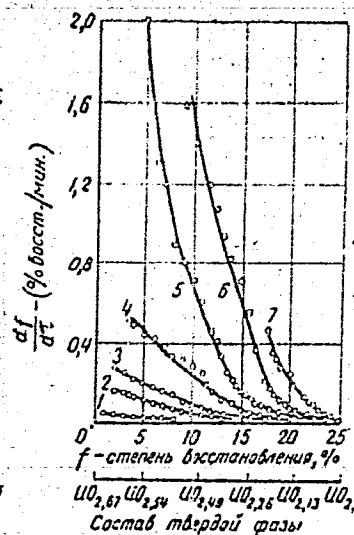
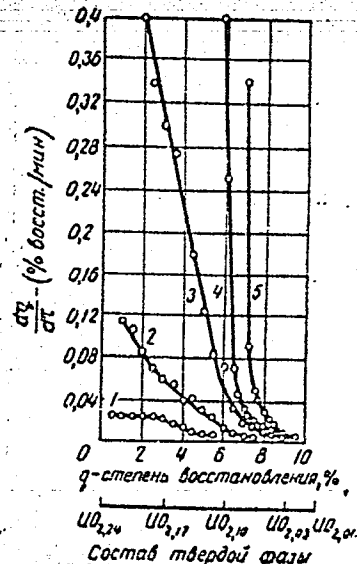


Fig. 3:



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Состав твердой фазы

Состав твердой фазы

Состав твердой фазы

S/126/63/015/003/024/025  
E039/E435

AUTHORS: Bessonov, A.F., Vlasov, V.G.

TITLE: On the question of the high temperature oxidation of metallic uranium

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.3, 1963, 477-478

TEXT: The oxidation of uranium by  $\text{CO}_2$  at temperatures above  $900^\circ\text{C}$  is investigated. The uranium (technical purity 99.8%) in the form of plates is first degreased in benzene, etched with cold concentrated nitric acid and then thoroughly washed in ethyl alcohol. Isotherms are measured at temperatures of 900, 950 and  $1000^\circ\text{C}$  for a  $\text{CO}_2$  pressure of 420 mm Hg. It is shown that the dependence of the rate of oxidation of uranium on the pressure of  $\text{CO}_2$  is given by

$$v = aP_{\text{CO}_2}^n \quad (1)$$

where  $n = \frac{1}{4}$ ;  $a$  is a temperature constant;  $P_{\text{CO}_2}$  is the pressure of  $\text{CO}_2$ . It is also shown that the rate of circulation of  $\text{CO}_2$  has practically no effect on the reaction rate. The  
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On the question of the high ...

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E039/E435

disintegration of the sample is caused by the phase changes  $U_{\gamma} \xrightarrow{772^{\circ}} U_{\beta}$  which produces an increase in volume and  $U_{\beta} \xrightarrow{672^{\circ}} U_{\alpha}$  which produces a decrease in volume. X-ray diffraction analysis shows that there is a layer of  $UO$  on the surface of the  $UO_2$ . This is also detected chemically together with the mono-nitride and mono-carbide in the surface scale of uranium oxidized at  $CO_2$  at  $1000^{\circ}C$ . The catalytic effect of  $UO_2$  is demonstrated by comparing the rates of oxidation of pure iron powder and a mixture of iron powder and  $UO_2$  (20% by wt Fe). The  $UO_2$  produces a significant increase in the rate of oxidation of the iron. When the temperature of uranium is increased from  $900$  to  $1000^{\circ}C$  the rate of oxidation decreases owing to an increase in density of the  $UO_2$ . At temperatures  $< 780^{\circ}C$  the oxidation is accomplished by oxygen diffusing through the oxide layer but at temperatures  $> 900^{\circ}C$  the rate of diffusion of the metal through the scale becomes significant. There are 2 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova  
(Ural Polytechnical Institute imeni S.M.Kirov)

Card 2/3



On the question of the high ...

S/126/63/015/003/024/025  
E039/E435

SUBMITTED: September 2, 1962 (initially)  
October 6, 1962 (after revision)

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S/080/63/036/001/004/026  
D204/D307

AUTHORS: Vlasov, V.G. and Zhukovskiy, V.M.

TITLE: The reduction of  $U_3O_8$  with decomposed ammonia

PERIODICAL: Zhurnal prikladnoy khimii, v. 36, no. 1, 1963, 42 - 47

TEXT: The reduction kinetic were studied on (I)  $U_3O_8$  made by firing  $UO_4 \cdot nH_2O$  in air at 800°C for 5 hrs, and (II)  $U_3O_8$  made by oxidizing  $UO_2$  in air at 550°C over 5 hrs. The reducing mixture was obtained by passing  $NH_3$  over a Ni catalyst at 930°C. Measurements of the temperature-dependence of the rate of reduction (at a pressure of 200 mm, between 450 and 650°C) showed that the curves were practically the same for specimens I and II; the apparent activation energy was  $E = 32.2 \pm 1.6$  kcal/mole. The kinetic curves and x ray diffraction studies showed that the reaction may be represented by the sequence:  $U_3O_8 \rightarrow U_{3-x}O_{8-x} \rightarrow U_{3-x}O_{8-x_{max}}$

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The reduction of  $U_3O_8$  ...

S/O8C/63/036/001/004/026  
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$\rightarrow U_4O_9 \rightarrow UO_{2+x_{max}} \rightarrow UO_{2+x}$ . The reaction was retarded by water vapor, especially at the lower temperatures. The pressure-dependence of the rate  $v$  (at 600°C, between 50 and 600 mm Hg of  $(3H_2 + N_2)$ ) was

$$v = k \times p_{H_2}^n$$

where  $n = 0.80 \pm 0.02$  is little dependent of the specimen. Various possible rate-determining stages are discussed, proposing that the rate-limiting stage is in this case the interaction of adsorbed (atomic and molecular) hydrogen with oxygen of the oxide. There are 4 figures.

ASSOCIATION: Ural'skiy politechnicheskiy institut imeni S.M. Kirova (Urals Polytechnic Institute imeni S.M. Kirov)

SUBMITTED: March 15, 1962

Card 2/2

1. INTRODUCTION

2. SUMMARY

3. CONCLUSIONS

ABSTRACT: Additional data is presented on the effect of the addition of a small amount of a certain substance to a mixture of two other substances. The results show that the addition of the substance in question causes a significant change in the properties of the mixture.

the apparent energy of activation of NO<sub>2</sub> is 11.5 kcal/mole

ADDITIONAL INFO: none

SUBMITTED: 27 Nov 62

Card 2/2

L 10860-66 EWT(m)/EWP(t)/EWP(b) IJP(c) ES/JD/WH/JG

ACC NR: AT5028248

SOURCE CODE: UR/2631/65/000/006/0131/0136

AUTHOR: Strekalovskiy, V. N.; Beketov, A. R.; Vlasov, V. G.

ORG: Institute of Electrochemistry, Ural Branch, Academy of Sciences SSR (Akademiya nauk SSSR, Ural'skiy filial, Institut elektrokhimii)

TITLE: Study of the density and structure of uranium oxides in the range of the compositions  $UO_3-U_3O_8$

SOURCE: An SSSR, Ural'skiy filial, Institut elektrokhimii, Trudy, no. 6, 1965. Elektrokhiimiya rasplavlennykh solevykh i tverdykh elektrolitov (Electrochemistry of fused salts and solid electrolytes), 131-136

TOPIC TAGS: crystal defect, solid solution, uranium compound, x-ray diffraction analysis

ABSTRACT: The density and structure of samples produced by the dissociation of  $\alpha$  and  $\gamma$  forms of  $UO_3$  in a vacuum are studied. The density is determined by vacuum pycnometry, and the x-ray phase analysis is carried out with a URS-70 unit. Comparison of data of both sets of measurements show that the density depends on the structure of the products formed in the  $UO_3-UO_{2.67}$  system. The unit cell parameters of the solid solutions with a hexagonal structure in the range of  $\alpha-UO_3-UO_{2.9}$  and with an orthorhombic structure in the range of  $UO_{2.2}-UO_{2.67}$  are calculated. It is shown that the latter is a defect solid solution, and

Card 1/2

L 10860-66

ACC NR: AT5028248

that the defects are characteristic of both the oxygen and uranium sublattices. Orig. art. has: 2 figures and 1 table.

SUB CODE: 07, 11, 20/ SUBM DATE: none/ ORIG REF: 001/ OTH REF: 007

CC  
Card 2/2

BEKETOV, A.R.; STREKALOVSKIY, V.N.; VLASOV, V.G.

Studying the structure of solid solutions of uranium oxides  
in the region  $\alpha$ -UO<sub>3</sub> - U<sub>3</sub>O<sub>8</sub>. Zhur. strukt. khim. 6 no.1:75-  
78 Ja-F '65. (MIRA 18:12)

1. Ural'skiy politekhnicheskii institut. Submitted February  
24, 1964.



BLASTOV, A.R.; STREKALOVSKIY, V.N.; VLASOV, V.G.

Study of the structure of uranium gamma-irradiation. Zhur.  
struk. khim. 6 no.2:164-165 Feb '65.

(MIR: 1011)

1. Ural'skiy politekhnicheskiy institut. Submitted February  
24, 1964.

TKACHENKO, Ye.V.; BEKETOV, A.R.; VLASOV, V.G.

Reduction of the hexagonal modification of uranium trioxide  
by solid carbon. Izv. vys. ucheb. zav.; tsvet. met. 8 no.3;  
100-107 '65. (MIRA 18:9)

1. Ural'skiy politekhnicheskiy institut, fiziko-tekhnicheskiy  
fakul'tet.

L 12159-66 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) IJP(c) ES/JD/WN/JG

ACC NR: AP6000689

UR/0030/65/038/009/2103/2105

AUTHOR: Beketov, A.R.; Vlasov, V.G.

ORG: None

TITLE: Thermal stability of polymorphic uranium trioxide

SOURCE: Zhurnal prikladnoy khimii, v. 38, no. 9, 1965, 2103-2105

TOPIC TAGS: uranium compound, thermal stability, phase diagram

ABSTRACT: The article presents the results of a thermographic, kinetic, and x-ray study of the processes of decomposition of amorphous  $UO_3$ , alpha- $UO_3$ , beta- $UO_3$ , and gamma- $UO_3$ . Amorphous  $UO_3$  was prepared by calcining uranium peroxide for 3 hours at  $350^\circ$  in a stream of oxygen, with supplementary heating for 1 hour at  $400^\circ$ . Alpha- $UO_3$  was prepared by calcining uranium peroxide in air for 3 hours at  $550^\circ$ . Beta- $UO_3$  was prepared by calcining ammonium diuranate in air at  $400^\circ$  for 3 hours. Gamma- $UO_3$  was prepared by calcining previously calcined uranyl nitrate hexahydrate at  $550^\circ$  for 4 hours in air. It was established by chemical analysis that the oxides obtained had the following composition: amorphous  $UO_3-UO_{2.01 \pm 0.01}$ , alpha- $UO_3-UO_{2.00 \pm 0.01}$ , beta- $UO_3-UO_{2.02 \pm 0.01}$ , gamma- $UO_3-UO_{2.01 \pm 0.01}$ .

Thermal, kinetic, and x-ray analysis (results given in figures) made it possible to understand the phase relationships in the dissociation of

Card 1/2

UDO: 546.791.3 + 541.66

L 12159-66

ACC NR: AP6000689

amorphous  $\text{UO}_3$ . The temperatures of the start of dissociation for alpha- $\text{UO}_3$ , beta- $\text{UO}_3$ , and gamma- $\text{UO}_3$ , determined by a kinetic method, are respectively equal to 460, 430, and 510°. Curves for the heating of polymorphous  $\text{UO}_3$  in a vacuum show that the dissociation process of alpha- $\text{UO}_3$  proceeds at 575-613°, beta- $\text{UO}_3$  at 525-570°, and gamma- $\text{UO}_3$  at 610-660°. The final product of the dissociation of all forms of  $\text{UO}_3$  is the  $\text{U}_3\text{O}_8$  phase. The divergences in the temperatures for the start of dissociation, determined from thermographic and kinetic investigations, are connected with the special characteristics of the methods. The data indicates that the thermal stability of polymorphic  $\text{UO}_3$  increases in the following order: amorphous  $\text{UO}_3$ , beta- $\text{UO}_3$ , alpha- $\text{UO}_3$ , and gamma- $\text{UO}_3$ . Orig. art. has: 2 figures.

SUB CODE: 07/ SUM DATE: 09Jul63/ ORIG REF: 005/ OTH REF: 006

20

HW  
Card 2/2

L 00087-66 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) IJP(c) ES/JD/WW/JG  
 ACCESSION NR: AP5022339 UR/0149/65/000/003/0100/0107  
 661.879  
 AUTHOR: Tkachenko, Ye. V.; Beketov, A. R.; Vlasov, V. G.  
 TITLE: Reduction of the hexagonal modification of uranium trioxide by solid carbon  
 SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 3, 1965, 100-107  
 TOPIC TAGS: uranium compound, carbon, chemical reduction  
 ABSTRACT: The article gives the results of an investigation, by kinetic and X-ray means, of the reduction of the hexagonal modification of uranium trioxide (alpha-UO<sub>3</sub>) by solid carbon. The reducing agent was acetylene carbon black (ash content 0.07%) previously held in a vacuum dryer for ten hours at 250C. The alpha-uranium trioxide was prepared by calcination of uranium peroxide at 520C for three hours. The oxide obtained had a brown color, a density of 6.74 grams/cm<sup>2</sup>, and a specific surface of 5.3 meter<sup>2</sup>/gram. X-ray analysis indicated a hexagonal structure. The tests were carried out in a high vacuum unit (pressure not more than 10<sup>-2</sup> mm Hg) with constant control of the weight changes of the solid reagents. The reduction was studied in the temperature region of 500-615C  
 Card 1/2

L 00087-66

ACCESSION NR: AP5022339

because at lower temperatures the reaction is too slow and at higher temperatures it is too fast for experimental determinations. It was established that the reduction of alpha-uranium trioxide by acetylene carbon black at a noticeable rate starts at 440C. It was also established that with an increase in temperature in the pressure of carbon dioxide in the reaction zone, and with an increased degree of contact between the reagents, the rate of the reduction process is considerably improved. X-ray analysis shows that alpha- $\text{UO}_3$  and  $\text{U}_3\text{O}_8$  form a continuous series of solid solutions. During this process, within the limits of a single phase there is observed a transition from hexagonal symmetry (alpha- $\text{UO}_3$ ) to orthorhombic ( $\text{U}_3\text{O}_8$ ). Orig. art. has: 3 figures

ASSOCIATION: Ural'skiy politekhnicheskiy institut. Fiziko-tekhnicheskiy fakul'tet (Ural Polytechnic Institute, Faculty of Physico-technical Studies)

SUBMITTED: 13Apr64

ENCL: 00

SUB CODE: IC, GC

NR REF SOV: 016

OTHER: 009

Card 2/2 *pl*

BEKETOV, A.R.; VLASOV, V.G.; STREKALOVSKIY, V.N.

Phase transitions during the dissociation of  $\beta$  and  $\gamma$ -forms of  
uranium trioxide. Zhur.neorg.khim. 10 no.4:737-740 Ap '65.  
(MIRA 18:6)

L 63052-65 ENG(j)/ENT(m)/EPF(c)/EPF(n)-2/ENP(t)/ENP(b) Pr-4/Ps-4/Pa-4

IJP(o) ES/JD/HH/JG

ACCESSION NR: AP5017773

UR/0080/65/038/007/1447/1451

66.094.2+546.791

AUTHOR: Tkachenko, Ye. V. Vlasov, V. G. Semanin, Yu. N.

TITLE: Carbothermic reduction of higher uranium oxides in the presence of alkali metal carbonates

SOURCE: Zhurnal prikladnoy khimii, v. 38, no. 7, 1965, 1447-1451

TOPIC TAGS: uranium oxide, carbothermic reduction, alkali metal carbonate

ABSTRACT: The effect of lithium, sodium, and potassium carbonates on the vacuum carbothermic reduction of amorphous uranium trioxide at 460°C and uranous-uric oxide at 700°C by acetylene black was studied. In the case of the latter oxide, the addition of alkali metal carbonates was found to have an accelerating effect which increases in the series  $K_2CO_3 > Na_2CO_3 > Li_2CO_3$ . During the initial stages of the process, the carbonates accelerate the reduction of uranous trioxide, later, potassium carbonate slows it down, lithium carbonate accelerates it, and sodium carbonate has practically no effect on its rate. The mechanism by which alkali metal carbonates act involves two processes: dissociation of the

Card 1/2



L 63052-65

ACCESSION NR: AP5017773

carbonates into the metal oxide and carbon dioxide, and reaction of the carbonates with the uranium oxides to form the corresponding uranates. Orig. art. has: 1 table and 4 formulas.

ASSOCIATION: None

SUBMITTED: 31Dec64

NO REF SOV: 018

ENCL: 00

SUB CODE: IC

OTHER: 003

Card

2/2

VLASOV, V.G.; TKACHENKO, Ye.V.; LEBEDEV, A.G.

Mechanism of the reduction of uranium oxides by solid carbon.  
Zhur.prikl.khim. 37 no.7:1414-1420 J1 '64.

(MIRA 18:4)

VLASOV, V.G. · SHALAGINOV, V.N.

M

Kinetics of the reaction of the mixed lower and higher oxide  
of uranium with carbon monoxide. Zhur. prikl. khim. 37 no.9:  
1865-1871 S '64. (MIRA 17:10)

L 43129-65 ENG(j)/EWT(1)/EWT(m)/ENP(j)/ENA(h)/ENA(1) Pc-4/Peb RM  
 ACCESSION NR: AR5008437 S/0081/65/000/003/S061/S061

SOURCE: Ref. zh. Khimiya, Abs. 3S355

AUTHOR: Nagornaya, L. L.; Bezuglyy, V. D.; Vlasov, V. G.

TITLE: A study of the stability of plastic scintillators on a polystyrene base

CITED SOURCE: Sb. Stsintillyatory i stsintillyats. materialy. Vyp. 3. Khar'kov, Khar'kovsk. un-t, 1963, 85-90

TOPIC TAGS: polystyrene scintillator, scintillator property, polymerization environment, residual monomer, scintillation efficiency, scintillator stability, polystyrene aging

TRANSLATION: The authors analyzed the effects of various factors (i.e. temperature, humidity, natural illumination) on the aging of plastic scintillators and on their stability in relation to time. The scintillators were made by polymerizing styrene with or without one or two additions of PPP (2%) and POPOP (0.06%) for 8, 16, 24, 32, 50, 70 or 100 hrs. at 125, 140, 170 or 200C. The polymerization occurred in a N<sub>2</sub> atmosphere, inside sealed glass ampoules. The volume of solution was 10 ml. The obtained blocks were machined on a lathe and

Card 1/2

L 43129-65

ACCESSION NR: AR5008437

then carefully polished with a felt disk, using a water suspension of optical polishing crocus. Samples were stored under various conditions. It was established that the content of residual monomer in a scintillator must be kept at minimal levels. Material polymerized for 32 hours at 170-180C into blocks with a diameter of 20 mm provided the best scintillators. Scintillation efficiency was 85% over periods of 2.5 years at 20-40C where light was absent or the environment highly humid. The plastic scintillator should not be subjected to recurrent sharp fluctuations of temperature (see: *Radiokhimiya*, 1964, 35373).  
L. Kotlyarevskaya.

STB CODE: OP, MT

ENCL: --00

Card 2/2 JC

VLASOV, V.G.; TKACHENKO, Ye.V.

Reduction of uranium <sup>6</sup>-dioxide with solid carbon. Zhur.  
prikl. khim. 37 no. 5:946-951 My '64. (MIRA 17:7)

L 19643 -65 EPF(n)-2/EWT(m)/EWP(b)/EWP(t) Pu-4 / Ph-3  
ACCESSION NR. AP4045189 ES/WW/JD/JG/ S/0080/64/037/009/1865/1871

**AUTHOR:** Vlasov, V. G.; Shalaginov, V. N.

TITLE: Kinetics of the reaction of the mixed oxide of uranium with carbon mono-  
oxide

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 9, 1964, 1865-1871

**TOPIC TAGS:**  $\text{U}_3\text{O}_8$ ,  $\text{U}_3\text{O}_8$  reduction, carbon monoxide, reaction kinetics, carbon monoxide reducing agent, energy of activation, uranium peroxide calcination,  $\text{UO}_2$  formation,  $\text{UO}_3$  reduction,  $\text{UO}_2$  oxidation, reducing gas pressure, phase transition, carbon monoxide adsorption

**ABSTRACT:** The kinetics were studied of the carbon monoxide reduction of two varieties of mixed oxides of uranium:  $U_3O_8I$  and  $U_3O_8II$  at pressures of 20-200 mm Hg.  $U_3O_8I$  was prepared by calcining  $UO_4 \cdot nH_2O$  in an oxygen current for 6 hours at 400C to obtain the trioxide which was then reduced with hydrogen at 450-500C to the dioxide. The latter was oxidized in air at 500C for 6 hours to  $U_3O_8I$ . The other sample was prepared by calcining uranium peroxide in air at 800C for 5

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L 19643-65

ACCESSION NR: AP4045189

hours. Carbon monoxide reduction reactions were then run at 250-400C with  $U_3O_8I$  and at 280-450C for  $U_3O_8II$ . Practically no reduction occurred at 250C. Under identical conditions the rate of the reduction of  $U_3O_8I$ , specific surface =  $2.5 \text{ m}^2/\text{gm}$ , was 2-4 times faster than the rate of the reduction of  $U_3O_8II$ , specific surface =  $1.1 \text{ m}^2/\text{gm}$ . Above 300C the reduction was a rapid process followed by a slow down. The process was accompanied by the evolution of oxygen from the oxide. At the end of the reduction process the oxide was in the tetragonal phase. Kinetics curves for  $U_3O_8I$  in 200C and  $U_3O_8II$  in 280C were obtained. For  $U_3O_8II$  inflections occurred on the 415 and 450C curves at  $x = 55\%$ , and on the 400C curve at  $x \sim 60\%$ . The composition of the reductions at 330C was  $UO_2 + x = 0.04 + x = 0.08$ . The phase transitions occurring during these reductions were summarized:  $U_3O_8 \rightarrow U_4O_9 \rightarrow UO_2 + x_{\text{max}} \rightarrow UO_2 + x$  (the lower limit of the tetragonal phase)  $\rightarrow$  tetragonal phase  $\rightarrow U_4O_9 \rightarrow UO_2 + x_{\text{max}} \rightarrow UO_2 + x$ . The energies of activation were calculated: for  $U_3O_8I$ ,  $E = 28.6 + 0.9 \text{ kcal/mol}$ , for  $U_3O_8II$ ,  $E = 18.9 + 0.9 \text{ kcal/mol}$ . The relationship between process rate and reducing gas pressure in both cases conformed to the equation  $v = kP^{1/2}_{CO}$ . It was shown the determining stage of the reducing process was the surface reaction

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L 19643-65

ACCESSION NR: AP4045189

between the adsorbed CO and the oxygen of the oxide. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 29Oct62

ENCL: 00

SUB CODE: GP, NP

NO REF SOV: 011

OTHER: 016

Card 3/3

TKACHENKO, Ye.V.; NEYMIN, A.D.; VLASOV, V.G.; STREKALOVSKIY, V.N.

Studying the electric conductivity of the system  $UO_3 - C$ .  
Izv. vys. ucheb. zav.; tsvet. met. 6 no.4:118-122 '63.  
(MIRA 16:8)

1. Ural'skiy politekhnicheskii institut.  
(Uranium oxides—Electric properties)

TKACHENKO, Ye.V.; NEUYMIN, A.D.; VLASOV, V.G.; STREKALOVSKIY, V.N.

Temperature dependence of the electric conductivity of higher  
uranium oxides. Fiz. met. i metalloved. 16 no.2:193-197 Ag '63.  
(MIRA 16:8)

1. Ural'skiy politekhnicheskii institut im. S.M. Kirova i  
Institut elektrokhemii Ural'skogo filiala AN SSSR.  
(Uranium oxides—Electric properties)  
(Metals, Effect of temperature on)

VLASOV, V.G.; ZHUKOVSKIY, V.M.; LEBEDEV, A.G.; SHALAGINOV, V.N.

Adsorption of certain gases on uranous-uranic oxides. Izv.  
vys. ucheb. zav.; tsvet. met. 6 no.4:113-117 '63. (MIRA 16:8)

1. Ural'skiy politekhnicheskiy institut.  
(Uranium oxides) (Adsorption)

BEKETOV, A.R.; VLASOV, V.G.

Dissociation of  $\sqrt{-\text{UC}_3}$ . Zhur. prikl. khim. 37 no.10:2175-2179 5 '64.  
(MIRA 17:11)



L 20980-65

ACCESSION NR: AP5003752

of uranous-uranic oxide.

On density-composition curves, the point characteristic of the compositions  $UO_{2.92} - UO_{2.88}$  was observed only when the initial compound was the  $\alpha$ -form of uranium trioxide. The specificity of this composition is not manifested in the dissociation of  $\gamma-UO_3$ . This indicates that the beginning of the formation of solid solutions with an ortho-rhombic structure depends on the modification of the initial  $UO_3$  preparation. The latter was an oxide of the composition  $UO_{2.88}$  in the case of  $\alpha-UO_3$  and  $UO_{2.76}$  in the case of  $\gamma-UO_3$ . In earlier studies, which noted the specificity of the composition  $UO_{2.9}$ , the initial preparations were the amorphous and the  $\alpha$ -form of uranium trioxide.

Thus, in the present study, the specificity of the composition  $UO_{2.9}$  is not manifested in the dissociation of  $\gamma-UO_3$ .

Orig. art. has 1 graph.

ASSOCIATION: none

SUBMITTED: 19Feb64

ENCL: 00

SUB CODE: IC, SS

NO REF SOV: 000

OTHER: 005

JPRS

Card 2/2





L 23515-65

ACCESSION NR: AP4047121

energies of activation for the dissociation process were determined at different degrees of dissociation: at 10% dissociation--42.5 kcal/mcl and at 25% , 60.5 kcal/mole. Orig. art. has: 2 tables and 1 figure

ASSOCIATION: None

SUBMITTED: 24May63

ENCL: 00

SUB CODE: 1C, 6C

NO REF SOV: 010

OTHER: 013

Card 2/2

VLASOV, V.G.; ZHUKOVSKIY, V.M.; BERENIN, A.G.; SYLASHOV, V.N.

Adsorption of some gases on uranium trioxide. Zhur. prikl. Khim.

37 no.10:2170-2175 0'64.

(MIRA 17:11)

SOV/112-59-2-3962

9(0)

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 2, p 253 (USSR)

AUTHOR: Vlasov, V. G.

TITLE: Phase Relations in a Frequency Conversion With Integral-Number Ratio  
Between the Frequencies (Fazovyie sootnosheniya pri preobrazovanii chastoty  
kolebaniya s tselochislennym sootnosheniyem chastot)

PERIODICAL: Uch. zap. Leningr. vyssh. inzh. morsk. uch-shche, 1956,  
Nr 2, pp 47-50

ABSTRACT: In frequency conversion of self-oscillations, the phase of the combination frequency depends only on the relations between oscillations at the converter input. In the case of oscillation conversion with an integral-number ratio between the frequencies, a difference-frequency oscillation appears if the converter characteristic is approximated by a polynomial of higher than the second degree; the phase of the difference frequency depends not only on the phase difference of oscillations applied to the input but also on the shape of the

Card 1/2

SOV/112-59-2-3962

Phase Relations in a Frequency Conversion With Integral-Number Ratio . . . .

converter characteristic. Formulae are developed for determining the additional phase angle which is due to nonlinearity of the converter characteristic, and a curve of this phase angle plotted against the phase difference of the oscillations applied to the converter is plotted.

V.I.R.

Card 2/2

SOV/112-58-1-1392

Translation from: Referativnyy zhurnal, Elektrotehnika, 1958, Nr 1, p 207 (USSR)

AUTHOR: Vlasov, V. G.

TITLE: Phase Relationships in Frequency Conversion  
(Fazovyye sootnosheniya pri preobrazovanii chastoty)

PERIODICAL: Tr. Novosibir. in-ta inzh. vod. transp., 1956, Nr 2, pp 212-217

ABSTRACT: As a result of application of an oscillation  $u = u_1 + u_2 = E_1 \sin(m\omega t + \varphi_1) + E_2 \sin(n\omega t + \varphi_2)$  (where  $m$  and  $n$  are integers and  $m > n$ ) to a converter whose characteristic can be presented as an exponential polynomial  $i = \sum a_k u^k$ , combination oscillations of the type  $\pm p m \omega \pm q n \omega$  are set up, where  $p$  and  $q$  are arbitrary integers from one to the number denoting the highest degree of the polynomial. The useful oscillation having a difference-frequency  $(m - n)\omega$  is formed by the term  $a_2 u^2$  (at  $q = p = 1$ ) as well as by other terms of the polynomial with degrees higher than the second. However, the phase  $\psi$  of the resulting oscillation depends not only on the initial phase difference  $\Delta\varphi$  of oscillations  $u_1$  and  $u_2$  but also on additional phase  $\eta$ , which is

Card 1/2

80V/112-58-1-1392

# Phase Relationships in Frequency Conversion

due to nonlinearity of the converter characteristic. Specifically, for a third-degree polynomial with  $u_1 = E_1 \cos (3\omega t - \Delta\varphi)$ ,  $u = E_n \cos 2\omega t$  ( $m/n = 3/2$ ),

$$\eta = -\frac{3}{4} E_2 \frac{a_3}{a_2} \sin^2 \varphi - \frac{9}{32} E_2^2 \left( \frac{a_3}{a_2} \right)^2 \sin 4\varphi.$$

Evaluation of the additional phase is rather important for phase-difference multiplication circuits, for regenerative frequency dividers, etc. A circuit diagram of the experimental oscillographic hookup is presented in the article as well as an experimental curve of the additional phase  $\eta$  vs. the difference of phase oscillations at the converter input (frequency relationship  $m/n = 3/2$  and  $4/3$ ). It is noted that, with proper selection of conversion conditions, the additional phase  $\eta$  can be reduced down to values acceptable for practical purposes.

M. V. N.

AVAILABLE: Library of Congress

1. Oscillation 2. Frequency converters 3. Mathematics

Card 2/2

VLASOV, V.G., kand.tekhn.nauk

Use of ship radars in navigation. Proizv.-tekhn. sbor. no.2:50-60  
'59. (MIRA 13:10)

1. Nauchno-issledovatel'skiy institut vodnogo transporta.  
(Radar in navigation)

SOV/5218

PHASE I BOOK EXPLOITATION

Vlasov, Viktor Grigor'yevich, and Vladimir Grigor'yevich Svechnikov

Osnovy radiotekhniki i elektroradionavigatsionnyye pribory (Fundamentals of Radio Engineering and Electrical Radio Navigation Instruments) Moscow, Izd-vo "Rechnoy transport", 1960. 279 p.  
Errata slip inserted. 5,800 copies printed.

Ed.: V. P. Konstantinov; Reviewers: Yu. I. Nikitenko and A. V. Zherlakov; Ed. of Publishing House: S. A. Vitashkina; Tech. Eds.: V. A. Bodrova, and M. I. Pokhlebkina.

PURPOSE: This book is recommended by the uchebno-metodicheskiy sovet pri Upravlenii kadrov i uchebnykh zavedeniy MRF (Council on Educational Methods of the Personnel and School Administration of the Ministry of the River Fleet) as a textbook for students in Marine Navigation courses of Institutes of Water Transportation Engineers.

COVERAGE: The book begins with a section on general problems of radio engineering. The design and principles of operation

Card ~~1/10~~



Fundamentals of Radio Engineering (Cont.)

SOV/5218

of instruments used on the vessels of the river fleet, such as radio transmitters, radio receivers, and electrical radio navigation devices are discussed. Some problems in the installation and operation of these instruments are reviewed. The first three parts of the textbook were written by V. G. Vlasov, Candidate of Technical Sciences, Docent, and the fourth part by V. G. Svechnikov, Candidate of Technical Sciences. The authors thank Yu. I. Nikitenko and A. V. Zherlakov, Candidates of Technical Sciences, Docents, and B. V. Konstantinov, Engineer for their advice. There are 17 references, all Soviet (including 1 translation).

TABLE OF CONTENTS:

Foreword

3

PART I. RADIO ENGINEERING

Ch. I. General Concepts on Radio Communications  
1. Radiation field

5

Card ~~2~~/10

GRISHCHENKO, I.L., inzh.; VLASOV, V.G., inzh.

Device for measuring the slippage of asynchronous motors in a wide  
range. Vest. elektroprom. 33 no.8:68-69 Ag '62. (MIRA 15:7)  
(Electric motors, Induction-Measurements)

ACCESSION NR: AP4038560

S/0080/64/037/005/0946/0951

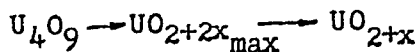
AUTHORS: Vlasov, V.G.; Tkachenko, Ye.V.

TITLE: Reduction of - uranium dioxide with solid carbon

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 5, 1964, 946-951

TOPIC TAGS: uranium betadioxide reduction, uranium dioxide, carboth-  
ermal reduction mechanics, uranium reduction, solid carbon, beta  
uranium dioxide

ABSTRACT: In view of the fact that the mechanics of metal oxide  
reduction with carbon at elevated temperatures are studied the  
least in theoretical metallurgy, the authors undertook a compre-  
hensive study of how  $\alpha$ -uranium dioxide,  $U_4O_9$  can be reduced by solid  
carbon (acetylene soot) at 700-950C to uranium dioxide,  $UO_2$ , or more  
precisely,



The composition of these uranium oxides is determined radiologically,  
with x varying between 0.18 and 0.02. This reduction was effected

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in a vacuum and the interaction of carbon, carbon monoxide and dioxide undergoes a detailed scrutiny resulting in the conclusion that the complex process of carbo/thermal reduction of  $U_2O_5$  is a combination of indirect reduction and stepwise gasification of carbon. Both processes stand in close physico-chemical and thermal relationship. Orig. art. has: 3 figures, 5 formulas, 2 tables.

ASSOCIATION: None

SUBMITTED: 07Jun62

ENCL: 00

SUB CODE: IC

NR REF SOV: 009

OTHER: 006

Card

2/2

L 23857-66 EWT(m)/EFF(n)-2/EWP(t) IJP(c) ES/JD/WW/JG/GS

ACC NR: AT6009941

(A)

SOURCE CODE: UR/0000/65/000/000/0197/0202

AUTHOR: Tkachenko, Ye. V.; Vlasov, V. G.

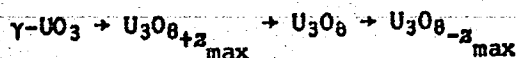
ORG: Ural Polytechnic Institute imeni S. M. Kirov (Ural'skiy politekhnicheskiy institut)

TITLE: Reduction of gamma-uranium trioxide by solid carbon

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Issledovaniya v oblasti khimii i tekhnologii mineral'nykh soley i okislov (Studies in the field of chemistry and technology of mineral salts and oxides). Moscow, Izd-vo Nauka, 1965, 197-202

TOPIC TAGS: uranium compound, carbon, chemical reduction

ABSTRACT: A kinetic and x-ray diffraction study of the processes involved in the reduction of orthorhombic uranium trioxide ( $\gamma\text{-UO}_3$ ) by solid carbon at 475°-580°C is described. It is shown that in analyzing the reduction mechanism, it is necessary to consider not only the participation of carbon but also the dissociation of the oxide and the direct interaction of the reagents in the solid phase. X-ray diffraction analysis established that  $\gamma\text{-UO}_3$  does not have a region of homogeneity, and that the phase transformations taking place during the reduction with carbon are:



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L 23857-66

ACC NR: AT6009941

Kinetic data showed that the temperatures of the start of an appreciable reduction of  $\gamma\text{-UO}_3$  and its dissociation in vacuum are close to each other. It is concluded that the principal part in the reduction of  $\gamma\text{-UO}_3$  is played by the gas phase, i. e., the reduction with participation of carbon monoxide; however, this process is associated with a substantial dissociation of  $\gamma\text{-UO}_3$ . The contact reduction of  $\gamma\text{-UO}_3$  is significant only at the start of the reaction. Orig. art. has: 3 figures, 1 formula.

SUB CODE: 07/

SUBM DATE: 04May64/

ORIG REF: 015/

OTH REF: 009

Card 2/2 *dda*

L 23869-66 EWT(m)/EPF(n)-2/ENP(t) IJP(c) JD/JG/GS

ACC NR: AT6009942

SOURCE CODE: UR/0000/65/000/000/0238/0241

AUTHOR: Sychev, Yu. N.; Vlasov, L. G.; Lapitskiy, A. V.

ORG: none

TITLE: Use of gas chromatography in the preparative purification of niobium and tantalum chlorides involving removal of iron

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Issledovaniya v oblasti khimii i tekhnologii mineral'nykh soley i okislov (Studies in the field of chemistry and technology of mineral salts and oxides). Moscow, Izd-vo Nauka, 1965, 238-241

TOPIC TAGS: tantalum compound, iron compound, niobium compound, chloride, adsorption, activated carbon, metal purification, gas chromatography

ABSTRACT: Gas chromatographic (gas adsorption) techniques were applied to the preparative separation of chlorides of certain rare elements from ferric chloride. The two pairs  $NbCl_5-FeCl_3$  and  $TaCl_5-FeCl_3$  were investigated and BAU activated carbon was used as the adsorbent. The preparation of this adsorbent and the apparatus employed in the removal of iron from  $NbCl_5$  and  $TaCl_5$  are described. The samples obtained after the purification were analyzed colorimetrically (iron was found to be absent) and radio-metrically (iron present in quantities of less than  $1 \cdot 10^{-6}\%$ , which is the sensitivity limit, determined by the specific activity of the iron-59 isotope introduced). Ana-

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L 23869.66

ACC NR: AT6009942

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lysis of the chromatographic column after the purification showed that iron has a convex adsorption isotherm on carbon relative to the axis of abscissas, and that high concentrations of ferric chloride move at a higher rate than low ones. This behavior of the chloride on carbon, similar to its behavior on silica gel, suggests that the removal of iron from tantalum and niobium can be carried out with a high separation factor. Orig. art. has: 2 figures.

SUB CODE: 07/

SUBM DATE: 28Nov63/

GRIG REF: 002/

OTH REF: 000

Card 2/2 dda



L 23867-66 EWT(m)/EPF(n)-2/ENP(t) IJP(c) JD/JG/GS  
ACC NR: AT6009943 SOURCE CODE: UR/0000/65/000/000/0242/0246

AUTHOR: Sychev, Yu. N.; Vlasov, L. G.; Lapitskiy, A. V.

ORG: none

18 27  
TITLE: Possibility of purifying niobium during the chlorination of  $Nb_2O_5$

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Issledovaniya v oblas-ti khimii i tekhnologii mineral'nykh soley i okislov (Studies in the field of chemis-try and technology of mineral salts and oxides). Moscow, Izd-vo Nauka, 1965, 242-246

TOPIC TAGS: niobium compound, metal purification, chlorination

ABSTRACT: An attempt was made to follow the behavior of certain impurities found in niobium pentoxide during its chlorination and to carry out a preliminary purification of niobium pentachloride during the chlorination process. The following labeled micro-impurities were used: iron-59, calcium-45, tin-113, phosphorus-32, and cadmium-115<sup>m</sup>. Niobium metal was chlorinated and the  $NbCl_5$  formed was dissolved in conc. HCl. Solu-tions of the isotopes were then added to portions of the HCl solution, and the speci-fic activity was determined. The pentoxide was then precipitated with ammonia and the degree of coprecipitation was determined by measuring the residual activity of the filtrate. Chlorination of  $Nb_2O_5$  labeled with tin-113 confirmed that niobium penta-chloride can be separated from group II impurities, since the pentachloride obtained

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L 23867-66

ACC NR: AT6009943

was free from them. It is thought that group I impurities can also be separated. Phosphorus could not be removed, apparently because of the formation of the thermally stable complex  $\text{POCl}_3 \cdot \text{NbCl}_5$ . Orig. art. has: 5 figures, 3 tables.

SUB CODE: 07/

SUBM DATE: 24Feb64/

ORIG REF: 004/

OTH REF: 004

Card 2/2 *dda*

STREKALOVSKIY, V.N.; BEKETOV, A.R.; VLASOV, V.G.

Nature of the oxide  $UO_2$ , 9. Zhur. neorg. khim. 9 no.10:2496  
O '64. (MIRA 17:12)

VLASOV, V. G.

Chemical Abst.  
Vol. 48 No. 9  
May 10, 1954  
General and Physical Chemistry

② Chem.  
/ Reactions of oxides and their compounds with solid carbon. ~~V. V. Gid' V. G. Vlasov, and N. N. Serebrennikov.~~  
~~J. Appl. Chem. U.S.S.R. 25, 120-41 (1952) (Engl. translation).—See C.A. 47, 4704h.~~  
H. L. H.

ACCESSION NR: AP4029535

S/0149/64/000/002/0135/0139

AUTHOR: Tkachenko, Ye.V.; Vlasov, V.G.; Semavin, Yu.N.

TITLE: The effect of a method of introducing  $K_2CO_3$  additives on the kinetics of carbon thermal reduction of the higher oxides of uranium

SOURCE: IVUZ. Tsvetnaya metallurgiya, no.2, 1964, 135-139

TOPIC TAGS: uranium trioxide, uranium, octoxide, potassium carbonate, additive,

ABSTRACT: The authors state the potassium carbonate, on decomposing, activated reagents which caused an increase in the reduction speed; on the other hand, the reaction of potassium carbonate with uranium oxides led to the formation of uranates on the surface of the oxides reduced which in turn screened a portion of the surface and, thereby, lowered the reduction speed. Therefore, the total effect of the potassium carbonate additive on the carbon thermal reduction of uranium oxides was determined by the ratio of 2 of these factors which act in opposing directions. In the reduction of  $UO_3$  ( $460^\circ$ ), the action of the potassium carbonate additives basically led to the inhibition of the reduction process due to the screening effect of potassium uranate that was formed. In the reduction of  $U_3O_8$  ( $700^\circ$ ), along with the formation of uranates, dissociation of  $K_2CO_3$  also occurred. It was established that

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ACCESSION NR: AP4029535

with all the variants of introducing the additives, an acceleration process of  $U_3O_8$  was observed. The greater the degree of the process of acceleration the fewer the potassium uranates were formed. Therefore, the greatest velocity increase occurred with the introduction of a dry additive into the reducer. Orig. art. has: 3 figures.

ASSOCIATION: Ural'skiy politekhnicheskii institut (Ural Polytechnical Institute)

SUBMITTED: 03Jun63

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: ML

NO REF SOV: 017

OTHER: 000

Card 2/2

ACCESSION NR: AP4029534

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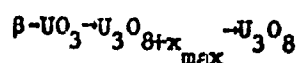
AUTHOR: Vlasov, V. G.; Beketov, A. R.

TITLE: Dissociation of  $\beta$ - $\text{UO}_3$

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 2, 1964, 130-134

TOPIC TAGS: beta uranium trioxide, dissociation, x-ray analysis, x-ray phase analysis, phase conversion

ABSTRACT: The authors investigated the results of x-ray analysis of the  $\beta$ -uranium trioxide system. The dissociation of  $\beta$ -uranium trioxide in a vacuum was found for various temperatures. On the basis of kinetic and x-ray phase methods, the formation of the phase  $\text{U}_3\text{O}_{8+x}$  was shown. The following procedure of phase conversion and the dissociation process of  $\beta$ -uranium trioxide was proposed:



A discussion of the results is presented from the position of modern representations of solid state physics and the electron mechanism of chemical reactions. Orig.

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ACCESSION NR: AP4029534

art. has: 1 figure and 1 table.

ASSOCIATION: Ural'skiy politekhnicheskii institut (Ural Polytechnical Institute)

SUBMITTED: 14Jun63

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: ML

NO REF SOV: 008

OTHER: 007

Card 2/2



VLASOV, V.G.; LISNYAK, S.S.

Effect of briquetting on the kinetic characteristics of magnetite  
reduction by graphite. Izv. vys. ucheb. zav.; chern. met, 6  
no.10:12-17 '63. (MIRA 16:12)

1. Ural'skiy politekhnicheskii institut.

ZHUKOVSKIY, V.M.; VLASOV, V.G.

Interaction of uranium trioxide with decomposed ammonia  
in the presence of some foreign oxide additions. Dokl.  
AN SSSR 153 no.5:1077-1080 D '63. (MIRA 17:1)

1. Ural'skiy politekhnicheskiy institut im. S.M. Kirova.  
Predstavleno akademikom A.A. Balandinym.

VLASOV, V.G.; BESSONOV, A.F.

Oxidation of uranium dioxide by air in the presence of added  
carbonates and oxides. Kin.i kat. 4 no.5:666-671 S-O '63.  
(MIRA 16:12)

1. Ural'skiy politekhnicheskii institut imeni S.M.Kirova.

VLASOV, V.G.; SHALAGINOV, V.N.; BESSONOV, A.F.; STREKALOVSKIY, V.N.

Change of the design of a glass pressure regulator. Trudy Ural.  
politekh.inst.no.121:102-103 '62.

(MIRA 16:5)

(Pressure regulators)

VLASOV, V.G.; ZHUKOVSKIY, V.M.

Reduction of uranosouranic oxide by decomposed ammonia. Zhur.prikl.khim. 36 no.1:42-47 Ja '63. (MIRA 16:5)

1. Ural'skiy politekhnicheskii institut imeni S.M.Kirova.  
(Uranium oxides) (Reduction, Chemical) (Ammonia)

BABUSHKIN, V.F., mashinist-instruktor; VLASOV, V.I., mashinist-instruktor

Characteristics of operating N8 electric locomotives during the  
winter months. Elek. i tepl. tiaga 2 no.11:10-11 N '58.

(MIRA 11:12)

1. Dope Irkutsk II Vestechne-Sibirskoy deregi.

(Electric locomotives--Cold weather operation)

VLASOV, V.I., mashinist-instruktor

Improve the quality of locomotive air lines. Elek. i tepl.  
tiaga 2 no.12:36 D '58. (MIRA 12:1)

1. Lokomotivnoye depo Irkutsk II, Vostochno-Sibirskaya doroga.  
(Electric locomotives)

VLASOV, V.I.

Stratigraphy and conditions governing the formation of coal-bearing sediments in the eastern part of the Ili Depression.  
Izv. AN Kazakh. SSR. Ser.geol. no.3:28-43 '62. (MIRA 15:7)  
(Ili Depression--Coal geology)



VLASOV, Valerian Ivanovich; BERMAN, Yakov Isaakovich; KISLOV, A.G.,  
~~kand. tekhn. nauk, ratsenzent~~; PORTNOY, S.I., otv. red.;  
AZAROVA, I.G., red.; TSAL, R.K., tekhn. red.

[Design of the high-frequency units of radar stations] Pro-  
ektirovanie vysokochastotnykh uzlov radiolokatsionnykh stan-  
tsii. Leningrad, Gos.soiuznoe izd-vo sudostroit. promyshl.,  
1961. 356 p. (MIRA 15:2)

(Radar)

(Microwaves)

SERGEYEV, A.G., kand.tekhn.nauk; STERLIN, B.Ya., kand.tekhn.nauk; TROS'KO, V.I., inzh.; SHATOV, N.K., inzh.; VLASOV, V.I., inzh.; PEREPELYUK, N.D., inzh.

Refining of cottonseed oil in a micella. Masl.-zhir.prom. 26 no.12:  
30-32 D '60. (MIRA 13:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zhirov (for Sergeyev, Sterlin). 2. Sredneaziatskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta zhirov (for Tros'ko). 3. Tsentral'noye konstruktorskoye byuro Vsesoyuznogo nauchno-issledovatel'skogo instituta zhirov (for Shatov). 4. Kokandskiy maslozhirovoy kombinat (for Vlasov). 5. Ferganskiy maslozhirovoy kombinat (for Perepelyuk).  
(Cottonseed oil)

RZHEKHIN, V.P., kand.tekhn.nauk; BELOVA, A.D., inzh.; TROS'KO, U.I.,  
inzh.; KONEVA, Ya.A., inzh.; BORSHCHEV, S.T., inzh.; VLASOV,  
V.I., inzh.; ROZENSHTeyN, G.V., inzh.; TADZHIBAYEV, G.T.,  
inzh.

Separation of gossypol from prepassed oils and micelles with  
anthranilic acid. Masl. - zhir. prom. 27 no.8:26-29 Ag '61.

(MIRA 14:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zhirov (for  
Rzhekhin, Belova). 2. Sredneaziatskiy filial Vsesoyuznogo  
nauchno-issledovatel'skogo instituta zhirov (for Tros'ko, Koneva).
3. Kokandskiy maslozhirovoy kombinat (for Borshchev, Vlasov,  
Rozenshteyn, Tadzhibayev).

(Gossypol) (Anthranilic acid) (Oils and fats)

AUTHORS: Levin, A.I., and Vlasov, V.I. SOV/136-59-5-7/21

TITLE: Ways of Further Improving and Intensifying the  
Electrolytic Refining of Copper (Puti dal'nayshego  
uluchsheniya i intensifikatsii protsessa  
elektrorefinirovaniya medi)

PERIODICAL: Tsvetnyye metally, 1959, Nr 5, pp 32-38 (USSR)

ABSTRACT: A.I. Levin, with others (Ref 1) has set down optimal conditions for the electrolytic refining of copper. Experience at the Pyshma medelektrolitnyy zavod (Pyshma Electrolytic Copper Works) suggests that the practice there (as at other Soviet works) is equal to or better than the best abroad (Ref 2). At Pyshminsk 95% current utilization is obtained with 91-93% machine time of the series. Electrolysis is effected at 54-55 °C and a mean current density of 190 amp/m<sup>2</sup> with electrolyte containing 133 and 185-195 g/litre of copper sulphate and sulphuric acid, respectively. The cells are of identical dimensions facilitating the use of prefabricated linings. Corrosion of starting sheets (most intense at the liquid surface) has been reduced by lead-plating their top parts (suggested by M.I. Nomborg and S.P. Pyunnenen).

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SOV/136-59-5-7/21

Ways of Further Improving and Intensifying the Electrolytic Refining of Copper

Stainless steel (type 1Kh18N9T) starting sheets have given long service, but have not proved easier to strip than copper sheets. This stainless steel has found wide use in the electrolytic plant (e.g. for electrolyte heating tanks, pumps etc.). The author considers the current density used to be insufficient and discounts the view that high current density practice leads to deposit defects due to the deposition of antimony, arsenic, bismuth and other harmful impurities. Such effects can be avoided by proper procedures. Cathode quality can also be improved by additions of surface-active agents and much work in this direction has been done by Gintsvetmet, the Ural'skiy politekhnicheskii institut (Ural Polytechnical Institute) and the works research laboratory. The effect of mixtures of surface-active agents has been found to be greater than that of individual agents (Ref 5). The author discusses ways of reducing electricity consumption: increasing sulphuric acid concentration; increasing temperature; reducing inter-electrode distance; improving contact arrangements.

Card 2/3

SOV/136-59-5-7/21

Ways of Further Improving and Intensifying the Electrolytic Refining of Copper

Current leakage can be an important factor (Ref 9), and heat losses should be reduced by covering the electrolyte surface. In view of the 1959-1965 development planned for the Ural non-ferrous metals industry many new features are to be introduced into Pyshma practice and research, e.g. on raising the current density to 250-270 amp/m<sup>2</sup>, is to proceed.

Card 3/3

There are 9 references, of which 8 are Soviet and 1 English.

ASSOCIATIONS: Ural'skiy politekhnicheskii institut (Ural polytechnical Institute) and Pyshminskiy medselektrolitnyy zavod ( Pyshma Electrolytic Copper Works)

VLASOV, V.I., mashinist-instruktor

Suggestions on the further improvement of the circuits of an N8  
electric locomotive. Elek. i tepl. tiaga 4 no. 12:5 D '60,  
(MIRA 14:1)

1. Depo Irkutsk II Vostochno-Sibirskoy dorogi.  
(Electric locomotives)

VLASOV, V.I.

Principles of designing mechanisms for pneumatic control  
systems of crankshaft forging and press working machines.

Kuz.-shtam. proizv. 4 no.3:19-24 Mr '62. (MIRA 15:3)  
(Forging machinery) (Pneumatic control)



VLASOV, V.I.

Precise calculations of disk brakes for forging crank  
presses. Kuz. shtam. proizv. 4 no.11:24-29 N '62.

(MIRA 15:11)

(Power presses—Brakes)

VLASOV, V. I.

Technology

Stal'noe lit'e v metallicheskie formy. Iz opyta zavoda im. L. M. Kaganovicha (Casting steel in metallic forms). Moskva, Mashgiz, 1951. 88 88 p.

Monthly List of Russian Accessions, Library of Congress November 1952. Unclassified.

1. VLASOV, V. I.
  2. USSR (600)
  4. Steel Castings
  7. Effect of the transportation method for forms on the quality of steel castings, Lit. proizv., No. 12, 1952.
9. Monthly List of Russian Accessions, Library of Congress, April, 1953, Uncl.

137-58-6-13397

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 321 (USSR)

AUTHOR: Vlasov, V. I.

TITLE: The Effect of Casting Defects on the Fatigue Strength of Castings  
(Vliyaniye defektov otlivok na ikh ustalostnuyu prochnost')

PERIODICAL: Sb. dokl. po stal'n. otlivkam i povysheniyu ikh kachestva.  
Moscow, 1957, pp 58-76

ABSTRACT: Investigations performed dealt with the chemical composition, mechanical properties, and type of failure of a number of castings. The following factors were found to be the primary causes of premature failure of heavily loaded castings operating under cyclic static and dynamic loads: a) casting defects in the form of blisters, pores, friable zones, and cracks caused by fatigue processes; b) surface defects in the form of indentations, rough spots, films, and tucks and notches produced by pneumatic chisels. The formation of fatigue cracks is also aggravated by welding defects and, particularly, by fractures and cracks which appear in the vicinity of welded joints in the process of shop welding. Investigations demonstrated that low-alloy steel containing 0.14-0.26% C, 0.6501.49% Mn, and 0.17-0.63% Si

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